MAXWELL JONES

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Double major in **AI and Math** at CMU, graduating **May 2023**

Research Interests: **Computer Vision, Deep Learning, Multimodal Machine Learning**

Skills

PROGRAMMING LANGUAGES

Python
Java
C
JavaScript
HTML / CSS
LaTeX
SQL
Julia

TOOLS/FRAMEWORKS

NumPy
Pytorch
SciPy
Unix Command Line
Git
Sklearn
Keras
Pandas
Jupyter Notebook
regex
Matplotlib
OpenCV
Slurm

COURSEWORK

15-485 Intro to Deep Learning
16-385 Computer Vision
10-703 Deep Reinforcement Learning
10-725 Convex Optimization
10-315 Intro to Machine Learning
15-281 Artificial Intelligence
15-210 Parallel Algorithms
15-213 Computer Systems
21-484 Graph Theory
15-251 Theoretical Computer Science

HOBBIES/INVOLVEMENT

Panelist: AI Research @ CMU
Panelist: AI Jobs/Internships @ CMU
Judge: WWP Hacks 2022 (HS hackathon, $5000+ in prizes)
NSBE (National Society of Black Engineers)
Origami Club
Carnegie Mellon Club Basketball

Education

Carnegie Mellon University — Sept. 2019 to Current
BS Artificial Intelligence 2023 (Planned Masters Graduating 2024)
BS Math 2023
GPA: 4.0/4.0

Thomas Jefferson High School for Science and Technology — Sept. 2015 to May 2019
High School Diploma 2019
GPA: 4.1/5.0

University Research

Generative Modeling Research · Carnegie Mellon University — Oct. 2022 to Current

- Research under prof Jun-Yan Zhu in the Generative Intelligence Lab
- Investigating ability to finetune **stable diffusion** models to mimic images altered by hand
- Given some small set of altered images (cats with ears made pointy), can diffusion model learn alteration generally?
- Continuing work by Sheng-Yu Wang on **GAN** based methods, trying to transfer GAN-based results to diffusion based methods

Semi Supervised Learning Research · Carnegie Mellon University — Fall 2021 to Current

- Research under prof Nina Balcan in scalable graph-based Semi-Supervised Learning
- Leverage **K-Nearest Neighbor** graphs and **Conjugate Gradient Method** using **SciPy**
- Perform evaluation on **MNIST**, **CIFAR**, and common NLP datasets (20-newsgroups) with **Sklearn** using Bag of Words
- Achieved **same accuracy, 100x speedup** on large graphs with respect to closed form solutions with matrix inverses
- Used **Image Embeddings** from layer 2 of **Resnet-18** adapted for **CIFAR** in order to clean up more difficult image classification problem
- Plans to submit work to **PAKDD** in late November 2022

Industry Experience

Meta | FAIR Labs — New York City, NY
Software Engineer/Machine Learning Intern — May 2022 to Aug. 2022

- Co-authoring paper to benchmark algorithmic **Bias Amplification** of models from biased datasets.
- Using **ResNet-18, ClassyVision** and **Pytorch** to benchmark bias for controlled subsets of **The Visual Genome** dataset
- Creating custom datasets, running experiments with **Slurm**, and **Cleaning Data** for **Image Classification**
- Developed **Scripts** to run **Custom Config Files** using both **Bash** and **Python** for large scale hyperparameter testing/analysis
- **Managed project tasks** for myself and co-authors on **Computer Vision** FAIR team through weekly meetings, syncs and idea sharing
- Work currently in submission at **neurIPS** 2022 **TSRML** Workshop

Meta | Probability and Uncertainty — Remote
Software Engineer Intern — May 2021 to Aug. 2021

- Developed data perturbation training/evaluating/testing pipeline in **Python,** leveraging **Pytorch** for main testing
- Tested probabilistic models including **Bayesian**, **Ensemble**, and **Dropout** focused networks modeled off of **LeNet-5**
- Evaluated models on perturbed image data (**Random Cropping, Rotation, Jittering**)
- Used **MNIST** and **FashionMNIST** datasets for testing, Created visualizations using **Matplotlib** for presentation

Carnegie Mellon University — Pittsburgh, PA
Head Teaching Assistant 15-151 (Discrete Math), Teaching Assitant 15-251 (CS Theory) — Fall 2020 to Current

- Over 2+ years, **Head TA** for **50+ TAs,** impacting **500+ students** (Concepts of Mathematics, Theoretical CS)
- Responsible for **hiring, providing training** and **assessing performance** for TAs
- Contributed significantly to **course structure generation** and **exam creation**
- **Design/Lead staff meetings,** coordinate **TA-Professor interactions, delegate TA responsibilities**

Fiat Chrysler Automobiles — Remote
Data Science Intern — May 2020 to Aug. 2020

- Worked on amount of absentee workers prediction model across production plants
- **Significant increase in model accuracy** for absentee worker prediction at all plants (2% increase, 5000+ employees)
- Improved model performance by using **Random Forests** and **XGBoost,** cross referencing crew attendance across plants
- Queried data from **PostgreSQL** database and used **Pandas** library to store query results

Projects

Battlecode AI Competition (codebase) — Jan. 2022

- Created **Java** software on small team, for AI bot to compete against other teams in month-long MIT lead tournament
- Combined 500+ person-hours, 2000+ lines of code in both 2021 and 2022
- Leveraged **distributed** communication **algorithms** and **pathfinding** to increase bot's effectiveness
- Implemented **bit packing** methods, **Priority Queues** and **Stacks,** and **K-Means Clustering** to improve performance
- Placed top 10 out of 250 teams internationally(2021, 2022), 1st out of all first-time teams(2021), **$2000+ in prize winnings**

TartanHacks: Spot your Mood! (codebase) — Feb. 2021

- Competed in Carnegie Mellon's main Hackathon on team of 4
- Created an add on for **Spotify** using **Python** and **Flask** to track mood of users listening
- Developed **Vector Embeddings** for mood based on **Spotify API** metadata and sentiment analysis
- Used **Euclidean Distance** in the **Embedding Space** to execute recommendation decisions
- Functionality for both song and playlist generation based on mood factors and specific genre choices

TartanHacks: WalkSafe! (codebase) — Feb. 2020

- Developed a Python program on team of 4 that calculates safe and efficient walking paths at night in New York City
- Created a weighted graph from crime and street data and implemented an **A* Pathfinding** algorithm
- Integrated **Open Street Map API** and fetched data from NYPD crime database REST endpoint